

Seattle Aims to Reduce Downtown Energy Usage by 25 Percent with Smart Buildings

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The City of Seattle has a long and proud history in energy conservation. In a recent effort to deliver the most cost-effective and environmentally friendly way to meet its growing energy needs, it worked with Microsoft, Accenture, its local electric utility, and a local nonprofit to create a Smart Building program that aims to reduce downtown power usage by up to 25 percent. The solution uses Microsoft software and Microsoft Smart Building solution partners to apply predictive analytics to existing building management systems and optimize equipment for energy reduction.


Summary

Seattle, Washington, has been growing rapidly since the 1970s, attracting people who want an exceptional quality of life, plenty of natural beauty, and of course world-class coffee. However, accommodating a growing population (4 million and counting in the metropolitan area) means providing more electrical power.

But Seattle decided then that it didn't want to invest in building additional expensive and environmentally risky power generation plants; it wanted to make better use of the power it had while driving new technologies for energy efficiency. Recently, it partnered with Microsoft, Accenture, Seattle City Light, and Seattle 2030 District to launch the High-Performance Buildings Project, a Smart Building program aimed at reducing power consumption in Seattle commercial buildings.

The Smart Building solution being implemented by Accenture uses Microsoft software and cloud services to gain deeper insight from data generated by building management systems, sensors, controls, and meters. Windows Azure provides storage for terabytes of real-time energy data. Microsoft SQL Server 2012 processes this data for real-time analysis and equipment adjustment. And Microsoft SharePoint Server 2013 provides a reporting portal where building managers can monitor building energy efficiency.

Working with the partners named above, Accenture is deploying its Smart Building solution in five buildings, with plans to soon expand the program. The solution is expected to generate savings of between 10 and 25 percent for both energy and maintenance expenditures, which is significant considering the hundreds of thousands of dollars it costs annually to operate a large commercial building.



"We think our Smart Building project will not only enhance Seattle's energy conservation efforts and open new economic opportunities, but also serve as a model for other cities."

Brian Surratt, Deputy Director, Office of Economic Development, City of Seattle



City of Seattle

Company: City of Seattle

Website: www.seattle.gov

Country: United States

Industry: State and local government

Employees: 10,000

Partner: Accenture

Partner website: www.accenture.com

City Profile: Seattle, Washington, scenically located on Puget Sound, has a metropolitan-area population of 4 million and is one of the fastest-growing cities in the nation.

Partner Profile: Accenture is a global management consulting, technology services, and outsourcing company with 261,000 employees serving customers in more than 120 countries.

Solution:

- Create Smart Building strategy to conserve energy in downtown Seattle
- Work with Microsoft, Accenture, and a Smart Building ISV to achieve goals faster
- Use Microsoft software and cloud services to create solution quickly and cost-effectively

Software & Services:

- Windows Azure
- Microsoft SQL Server 2012
- Microsoft SharePoint Server 2013

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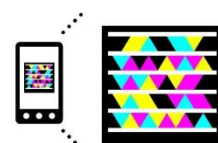
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The Full Story

Generate More Power Through Conservation

With an estimated 634,535 residents, Seattle is the largest city in the Pacific Northwest region of North America and one of the fastest-growing cities in the United States. The Seattle metropolitan area of around 4 million inhabitants is the fifteenth-largest metropolitan area in the country.

Like most major cities, Seattle is working to reduce energy consumption by helping consumers and businesses adopt retrofit and energy conservation programs. Seattle has abundant hydroelectric power, which met the city's needs through the 1960s and even allowed the city to sell surplus power. When Seattle started to grow in the 1970s, it began to run out of power and proposed to augment hydroelectric power with nuclear power plants. Citizens objected, however, indicating that they wanted to continue to use clean power. So the city decided that it would generate the power it needed through conservation rather than increased generation.

For a city growing as rapidly as Seattle, that meant a lot of conservation. Washington State's Energy Independence Act requires Seattle City Light to acquire 15 percent of the energy it provides from renewable sources by 2020. Partners such as the Seattle 2030 District have set a goal to reduce energy consumption by 50 percent by the year 2030 in a downtown district that encompasses 90 million square feet of building space. Seattle 2030 District is a nonprofit whose goal is to develop a high-performance building district in downtown Seattle. Most commercial buildings already have building management systems (BMS), sensors and software that monitor and control lighting, electrical systems, and heating, ventilation, and air conditioning (HVAC) equipment. However, those systems do not optimize the equipment for energy reduction.

The city wanted to help these big commercial buildings find a way to take energy conservation to the next level—to implement Smart Building technology, which uses predictive analytics to extend BMS systems and optimize equipment for energy reduction. City leaders knew that the Smart Building technology had to be affordable and easy to implement in order for building owners to participate.

Team Up for Faster Success

In 2011, the City of Seattle was awarded a grant from the US Department of Energy to invest in next-generation energy efficiency technologies. The grant was a perfect opportunity to get a Smart Building program underway. However, the city knew that it needed help.

"If you want to take an entrepreneurial approach to solving public sector problems, you need private sector partners," says Brian Surratt, Deputy Director, Office of Economic Development, for the City of Seattle. "Two of Seattle's strengths are its deep legacy in

energy efficiency and the fact that it has a strong software industry with companies such as Microsoft in its backyard. This intersection of software and energy efficiency presented a dynamic economic opportunity to not only take the city's energy efficiency to the next level but also to create new economic opportunities for the region." The vision was to develop a leadership position in building energy conservation, attract entrepreneurs and new companies, and grow jobs in existing companies that sell software and hardware used in Smart Building solutions.

The city began discussions with Microsoft on how they might work together and create a strategic relationship. Microsoft decided to engage Accenture, a global IT consultancy and Microsoft Alliance partner, about creating a Smart Building solution using low-cost Microsoft software and cloud services. "Cloud capabilities were really important to this project because of the fragmented nature of buildings across the city and the enormous amounts of data involved," says Charlie Cuniff, Strategic Advisor, Office of Economic Development, for the City of Seattle. "Dealing with terabytes of real-time data, performing trend analysis on that data, and adjusting specific pieces of equipment in real time requires serious data processing—a perfect application for the cloud."

In addition to Microsoft and Accenture, the city consulted with the Seattle 2030 District and with Seattle City Light, the local electric utility. Both had relationships with key downtown buildings, advised the city on which buildings to approach, and provided introductions to local building managers. "Engaging building managers and explaining to them that we could help them run their buildings a lot more efficiently was challenging," says Brian Geller, Executive Director at Seattle 2030 District. "But Seattle building owners are innovative and committed to exploring new ways to make their buildings more efficient. Our pitch that we could help them monitor their buildings every minute, 24 hours a day, and make adjustments to equipment in real time has been compelling."

Implement Quickly Using Software-Based Solution

The city identified five strategic downtown buildings, including a medical research facility, major office building, an industrial facility, and a hotel, totaling close to 2 million square feet, and began working with them on implementing a Smart Building solution. The solution is based on the Accenture Smart Building and Energy offering, which is a set of technologies that applies analytics to BMS data to optimize equipment for substantial energy reduction. Smart Building software identifies equipment and system inefficiencies and alerts building managers to the areas of wasted energy.

What's just as appealing to building managers is the predictability that Smart Building systems provide. The solution not only tells building managers how to optimize each piece of equipment for maximum energy reduction, but it also apprises

them of the health of their equipment. “If you’re hosting a major meeting and learn two days in advance that a key piece of HVAC equipment is about to fail, you’ll have time to repair or replace it before the meeting,” says Linda Lockwood, Key Customer Manager at Seattle City Light. “The predictive power of this tool can maintain comfort and reliability, which are just as important as the energy savings for many building owners.”

The Accenture solution uses Windows Azure, the Microsoft cloud services development, hosting, and management environment, to provide unlimited storage capacity for collecting real-time data for an unlimited number of buildings and HVAC devices.

Microsoft SQL Server 2012 processes the terabytes of data for real-time analysis. Microsoft SharePoint Server 2013 provides a user-friendly portal where building managers can monitor building energy efficiency, run reports, and drill down for more details on faults and alerts.

The city is currently deploying the solution in its initial group of five buildings and plans to be generating results by the end of 2013. The city will actively participate in the project’s implementation, review the performance results and measurement and verification methods, and as the project expands, assist future building owners with identified measures eligible for existing and potentially new conservation program incentives.

Reduce Energy Usage and Costs by Up to 25 Percent, Improve Customer Service, and Open New Economic Opportunities

Although the Seattle Smart Building program is in its infancy, the city has estimated that it will generate savings of between 10 and 25 percent for both energy and maintenance expenditures. That’s significant.

The Smart Building solution will also help building managers extend equipment life, because they’re able to reduce operating times and eliminate suboptimal operating conditions; reduce problem troubleshooting time; and increase comfort for building occupants. “Ripping and replacing these systems is horrendously expensive and simply not an option for most building owners,” Cunniff says. “This approach of working with existing systems is far more cost-effective, requires no construction, no interruption to tenants, and little training of building maintenance staff.”

Currently, Seattle City Light uses incentives and rebates to interest customers in implementing conservation measures. For instance, Seattle City Light offers medium and large commercial customers US\$0.23 per kWh saved for HVAC and lighting control retrofits. “This Smart Building project is another tool to help Seattle City Light customers reduce energy,” Lockwood says. “We believe that introducing our customers to this project’s concept and proving the benefits are achievable here in Seattle is good customer service.”

The City of Seattle also believes that the project has broader economic development implications and supports the city’s efforts to grow its clean technology sector. Seattle has a strong legacy in energy conservation and irreproachable international reputation in software. This project allows the city to use these existing assets and become a global leader in the development and delivery of energy efficiency technologies.

The unique partnership created through this project will also help Seattle address two major market barriers that keep companies from successfully launching new Smart Building products:

- *Performance verification.* One of the most pressing challenges to bringing a new energy efficiency product or service to market is the significant level of product demonstration and proof of energy savings often required to secure a first buyer.
- *Integration.* Innovators need to be able to identify how new Smart Building technologies interact with the complex system of design, materials, software, and operations that together determine a building’s energy efficiency.

Myriad energy efficiency goods and services offer the compelling promise of greater energy savings through integration across building components and systems, but these products need to be tested in the real world. The unique partnership among Seattle, Microsoft, Accenture, Seattle City Light, and Seattle 2030 District provides a unique opportunity to deploy and demonstrate such an innovative solution at city-scale.

“The use of Microsoft software to glean real-time, actionable insight from existing building data is a game-changer for building owners and utilities,” Surratt says. “We think our Smart Building project will not only enhance Seattle’s energy conservation efforts and open new economic opportunities, but also serve as a model for other cities.”

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